9.0 CONCLUSIONS

9.1 EXTENSIVE GREEN ROOFS: GENERAL CONCLUSIONS

Green roof benefits are compelling. Extensive green roofs definitely offer significant financial savings. In Tom Turner's 'post-post-modern' world of climate change and environmental catastrophe, green roofs offer to clean the air, purify water, reduce flooding and harmful CO_2 emissions. Extensive green roofs can offer verdant landscapes where grey concrete and asphalt once dominated. They can benefit the private householder or the entire surrounding public realm.

Proponents of green roofs see the problem as one primarily of education. This is certainly a vital ingredient. Professionals at all levels need to become versed in the benefits and the practicalities of green roofs. Research has been shown to be vital. Internationally universities, charitable organisations and environmental groups continue to play a role. It is timely that there are moves to translate research findings and make them widely available. Commercial enterprises have recognised a potential green roof market. It is evident that established German companies are now setting up in North America with success.

But very few green roof champions offer a comprehensive programme of action to popularise green roofs. A small number of enthusiastic, tireless and sincere campaigners have shown how to raise green roofs up the agenda by sheer hard work. Dunnett and Kingsbury's latest book is a timely addition to the green roof armoury. European, North American and now British green roof conferences are now established. It is clear they are vital too in the spread of information, opinion and best practise.

In Europe, the primary driver of the green roof agenda is biodiversity of flora and fauna. Few organisations or individuals appear to champion the technical and financial advantages on offer. This shows that an opportunity is being missed to legislate for and exploit the wider economic, environmental and aesthetic advantages of green roofs.

A wealth of green roof expertise now exists in Central Europe. North America is lagging 10 or more years behind Germany in their experience. Britain would seem to be further behind still.

9.2 EXTENSIVE GREEN ROOFS IN BRITAIN

It may require a culture change for extensive green roofs to gain widespread acceptance in Britain. They are currently viewed as a novelty. Architects tend to see them as decorative. Developers and clients see them as expensive. Environmental activists see them as a haven for plants, birds and bugs.

There are sincere moves to address the particular British situation. Nigel Dunnett attempts to introduce the green roof to domestic gardens. Dusty Gedge is very successfully arguing in the defence of an endangered songbird. Sheffield University is identifying the most appropriate flora for the British climate. Blackdown Horticultural Consultants have adapted the sedum roof to a popular industrial roofing system.

London Lord Mayor Ken Livingston and Lord Richard Rogers have weighed in as green roof proponents in their city. North American examples have shown that city mayors can give vital support to the green roof agenda. London is perhaps the only comparable British example of a large conurbation with an independently minded elected leader. If the political momentum, led by the GLA, can be informed, encouraged and sustained, it could have significant effect. The potential bill of £1.5 billion for a new stormwater drain in London has created an opportunity. Will a roof-greening strategy be considered as an alternative to this problem?

Opportunities exist outside of the capital. Local Authorities such as in Leicester are developing sophisticated policies on urban green spaces. Potential exists to add green roofs to these agendas. Planning Guidance can be applied locally to encourage planted roofs as an environmental measure.

Financial subsidies are normally given, for example to aid repair of historic buildings. They are given a direct value because of their quantifiable importance to our collective cultural heritage. It requires less than a small leap of imagination to foresee a collective

financial value being attributed to green roofs, in terms of air and water quality and environmental enhancement.

Primarily it can be concluded that the green roof agenda would benefit significantly from government support. However, Britain has now experienced over 25 years of increasing emphasis on the 'free-market'. It would therefore seem that the chances of obtaining government subsidy for green roofs are less favourable. But considering that the green roof movement has made inroads into 'free-market' North America, there are appropriate exemplars for a British strategy. There is a focus on the potentially rich green roof market. It can demonstrably become a 'win-win' situation for all parties - financially rewarding, job creating, environmentally sound, biodiversity enhancing. That is to say that private enterprise can form a strong partnership with elected governments to address the 'private' and 'public' concerns effectively.

If the construction industry (including architects) can be drawn into a programme of green roof activity then a vital link will be made between the technical, financial, ecological and aesthetic concerns.

Overall, it is pleasing to have discovered that green roof awareness in Britain is increasing with alacrity.

9.3 A WAY FORWARD

So how can the case be taken forward for extensive green roofs in Britain? The enthusiastic advocacy of environmentalists, botanists and other individuals is, of course, very welcome. Dunnett and Kingsbury's latest book is an important and welcome new resource. The dissemination of knowledge *is* vital. But a book will not, of its own accord, propel itself from the bookshop into the libraries of the people that need to read it - builders, developers, architects and politicians.

Some of the other necessary strategies have already been set in motion:

- Exploitation of the untapped British green roof market by the large European green roof developers, for example Bauder Ltd. They have a powerful commercial incentive

to promote their product, through product development, direct marketing and other publicity initiatives.

- Research and study by non-commercial bodies, for example Sheffield and Nottingham Trent Universities. It can be imagined that there is a commercial value attached to research. Evidently some of the conclusions of the research at Sheffield University will have found their way into lecturer Nigel Dunnett's latest book.
- A British Green Roof Conference drawing on international experience. This has taken place at Sheffield University, again driven by Nigel Dunnett.
- Exploitation of Britain's laws protecting flora and fauna. Dusty Gedge has been extremely successful in introducing green roofs to British cities to protect the Black Redstart.
- Campaigning and political lobbying by environmental and conservation groups.
- A new British not-for-profit green roof website, Livingsroofs.org
- Translation of the guidance of the German FLL guidance and research into English.

The London Biodiversity Partnership *has* published a long-term programme to popularise wildlife habitat, green roofs and their benefits. This is an impressive document, which illustrates how a co-ordinated campaign for greener roofs could unfold. It identifies interested partner organisations, suggests activity, proposes targets and a timetable for action [1]. For each activity it identifies a lead organisation. Its imaginative proposals (*this* author's comments in brackets) include:

- Lobbying of the GLA's 'Architecture and Urbanism Unit'.
- Ensuring guidance is incorporated into London's Supplementary Planning Guidance.
- Immediately setting up a 'Green Roof Task Force' (for London) to prepare and disseminate policy, and work with Government to make necessary changes to legislation.
- Organisation of a (London) Green Roof Conference (and fully published proceedings, it is hoped).
- Immediately organise an *annual* 'Birds on Buildings' event, a 'Bugs on Buildings' event for 2005 and a 'Plants on Buildings' event for 2006.
- Disseminate a 'Design Guide and Tool Kit'.

- Development of a suite of training events for developers, architects, designers
- Work with other partners to collate and publish quantitative evidence for costs and benefits of green roofs and walls, with technical specifications, for a range of audiences including development control officers.
- Complete and disseminate PhD research on performance of various roof substrates.

These proposed initiatives give a flavour of what is required to energise the British green roof experience. They could be adapted and applied to many other situations. Co-ordination becomes possible with web resources, particularly *Livingroofs.org*.

Positively, there is already a wealth of experience to draw from. Not all lessons have to be relearnt.

As a final suggestion, it could be argued that architects and designers have noticeably absented themselves from the arena of debate so far. There is evidence of designers who champion green roofs and hold strong opinions on the subject. It would help their cause if material could be published, or an argument engendered, about the aesthetic and formal potential of planted roofs. The public may have to reassess their attitude to plants, foliage and 'nature'. They may have to redefine their ideas of what is acceptable on buildings and what is 'beautiful'. Architects can be in a good position to lead this groundshift. They can contribute publicly to a fully informed, holistic appreciation of green roofs.

[1] London Biodiversity Partnership 'Generic Actions', www.lbp.co.uk (2004). Webpage, text or PDF document available at: *http://www.lbp.org.uk/03action_pages/ac02_genaction8.html*